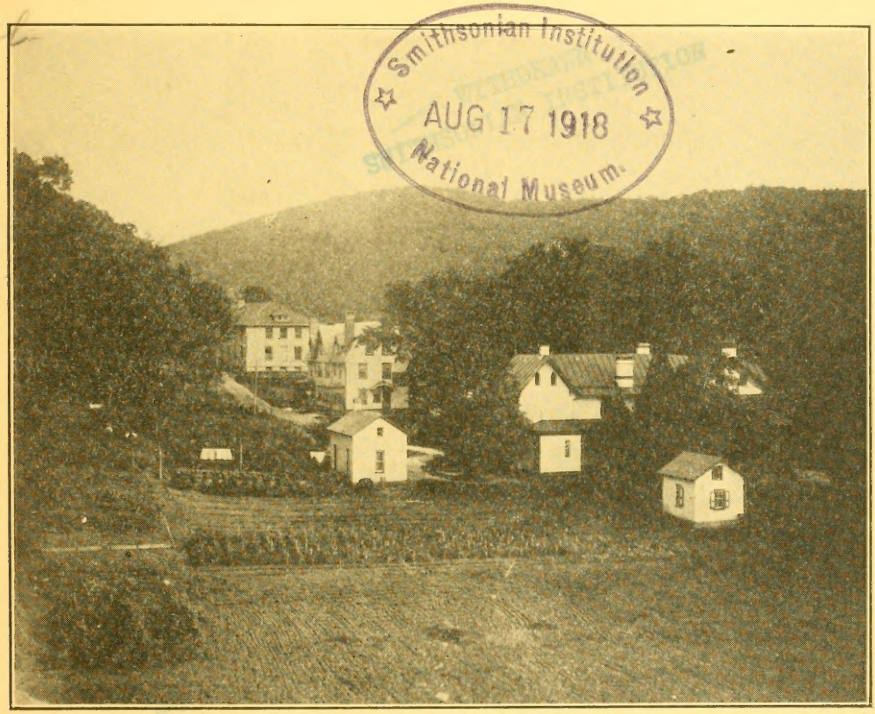
PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST ACADEMY

MONT ALTO, FRANKLIN COUNTY, PA.



GENERAL VIEW OF BUILDINGS

FIFTEENTH ANNIVERSARY 1903-1918

HARRISBURG, PENNA.:
J. L. L. KUHN, PRINTER TO THE COMMONWEALTH
1918

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PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN,
Commissioner of Forestry
IRVIN C. WILLIAMS, ESQ.
Deputy Commissioner of Forestry

STATE FORESTRY RESERVATION COMMISSION

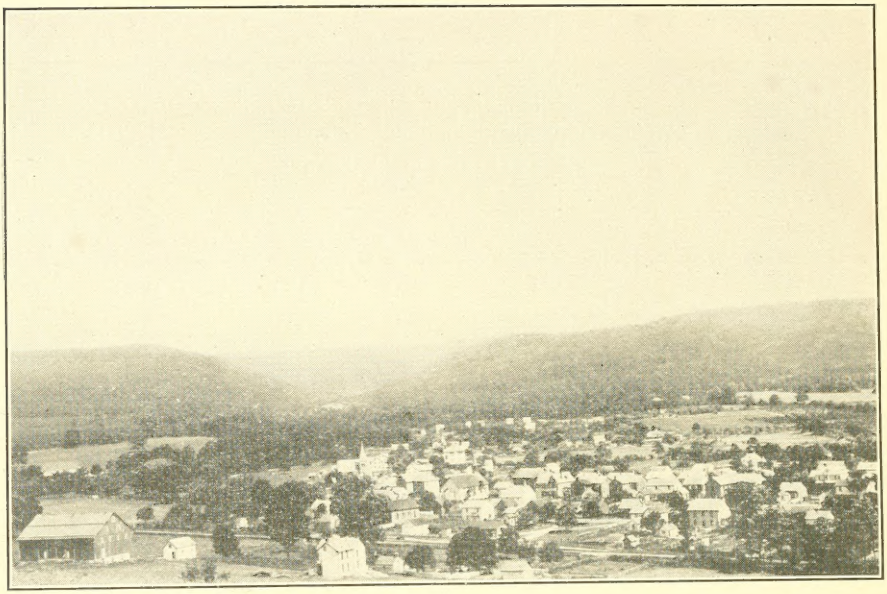
ROBERT S. CONKLIN, *President*
JOSEPH T. ROTHROCK, M. D.
WILLIAM P. STEVENSON
EDWARD BAILEY

FOREWORD.

The Pennsylvania Department of Forestry is undertaking the huge task of restoring the forests of the State to their original productive condition when they yielded abundant revenue to the owners, steady work for the laboring men, and healthful living conditions to all through their pure water supply, stream regulation, and prevention of erosion. To develop the one million acres of forest land purchased by the State, trained foresters were needed; and since no institution in the State could or would furnish them, the State Forest Academy was organized fifteen years ago.

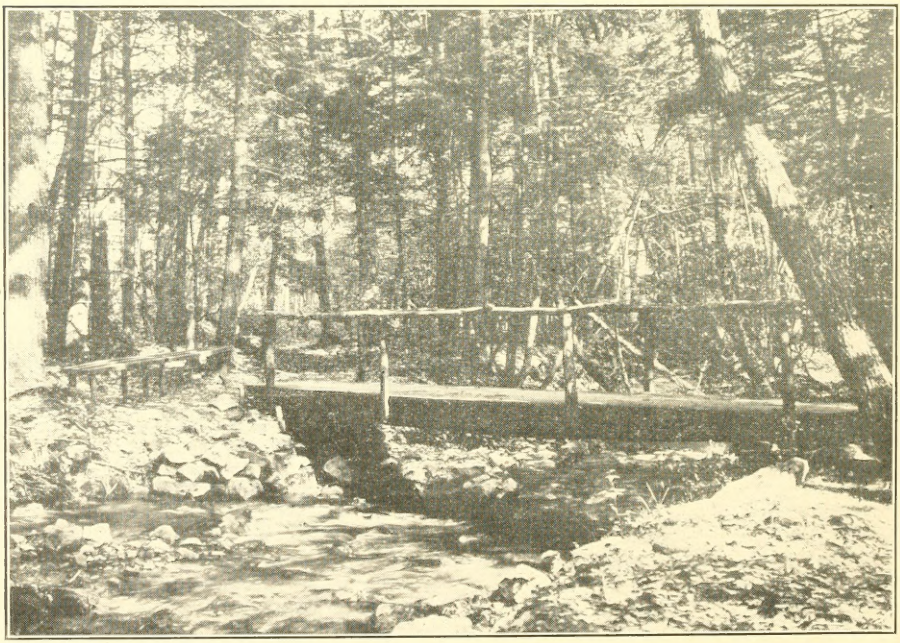
The following fifteenth anniversary announcement is made to the people of Pennsylvania to inform them of the past progress and present standing of the school and to bespeak their hearty co-operation in the very urgent restoration of the forests of the State. It is not an extravagent claim to say that the health and prosperity of the entire State hinge on the success or failure of this movement.

Mont Alto, Pa.,
March 15, 1918.



THE VILLAGE OF MONT ALTO.

Just Beyond the Town at the Western Foothills of the Picturesque South Mountains, and Within the Grove of Veteran Trees Standing at the Mouth of the Forested Gap, the Forest Academy is located.



A View in Mont Alto Park Conducive to Pleasant Walks and Interesting Out-of-Door Tree Talks.

Mira Lloyd Dock, Chairman Forestry Committee, General Federation of Women's Clubs.
S. T. Dana, United States Forest Service.
Hon. Charles Walter, Member of Pennsylvania House of Representatives.
Prof. Ralph Hosmer, Cornell University Forest School.
Raphael Zon, United States Forest Service.

ORIGIN AND EARLY HISTORY.

As early as 1876, in an address before the recently organized American Forestry Association at Philadelphia, Burnett Landreth pointed out the necessity of teaching Forestry as a science in itself and not as a branch of Agriculture. From that time, throughout the period of agitation and public education which preceded the foundation of the Department of Forestry there continued frequent references to the necessity of such a separate course or, better still, of a separate school devoted to the teaching of Forestry. Most of the ideas expressed were based on the European Forest Schools as models, but all recognized the necessity of adapting such a school to American needs and conditions. This agitation was especially strong in the years 1888 and 1889. During 1889 the trustees of the University of Pennsylvania established a chair of Forestry to be filled as soon as funds became available, but the chair was never filled.

Because of the slow growth of public sentiment in favor of Forestry, particularly among forest owners, no constructive steps were taken towards the establishment of a technical forestry course until about the year 1900. In issues of "Forest Leaves," in 1901 and 1902, are found several articles dwelling on the necessity of trained men to do forestry work upon the

large areas of land which were rapidly passing into the control of the Department of Forestry. Dr. J. T. Rothrock, then Commissioner of Forestry, took the lead in this movement. Endeavors were made to have scientific courses added to the University of Pennsylvania or to Pennsylvania State College. These schools refused at that time to undertake the work. Appreciating the actual need of men and realizing the great advantages of a practical school connected with actual forest work, Dr. Rothrock decided to establish such a school under the control of the Department of Forestry and locate it upon a State forest. In the spring of 1902 the State Forester, Mr. George H. Wirt, a Biltmore graduate, was sent to Mont Alto to take charge of the property recently purchased from the Mont Alto Iron Company, and establish a forest nursery. Although the legislature of 1901 had refused to adopt Dr. Rothrock's plans, he felt sure that two years would find a change in sentiment, and, as a preliminary measure, four young men, Ralph E. Brock, Charles Delaney, Robert G. Conklin, and Harvey E. Frankenfield were sent to help Mr. Wirt and get some instruction in Forestry. In January, 1903, Paul E. Arnold, a German forester, and graduate of the famous Tharandt Forest Academy in Saxony, was added to the teaching force. By act of May 13, 1903, the school was formally established and plans were made for the entrance of the first class. The Forestry Reservation Commission had, however, previously adopted, on June 4, 1902, a curriculum and plan of work submitted by Mr. Wirt for the forest school then in his charge.

The original idea was that the students admitted should be composed of young men from the wooded districts with practical woods experience, and the first class was partly composed of such men. It was soon recognized that these men were often unable to do the mental work required in a study

of scientific forestry and the entrance requirements were made strictly competitive with both physique and mental ability entering into the test. This plan has been constantly adhered to since that time.

At first there was some thought of moving the school to the Caledonia purchase as possessing better facilities, but this was finally given up and the administrative buildings of the old furnace at Mont Alto were utilized for the school. These were far from being ideal, and consequently the school was materially handicapped until in 1908, when ground was broken for the first of the present group of modern buildings.

LOCATION.

The Pennsylvania State Forest Academy is located about one mile from Mont Alto, a small village in Franklin County, which is sixty miles southwest of Harrisburg on the Cumberland Valley Railroad. The ground occupied by the school buildings is a part of the Mont Alto State Forest, which affords an opportunity for practical instruction and experimentation equalled by few, if any, American forestry schools. One of the foremost forestry educators of the United States called the Pennsylvania State Forest Academy, because of its excellent location, "the gem of American forest schools." The situation is healthful and the school is supplied with water from a spring located in the interior of the 23,000-acre forest. To the west of the school lies the Cumberland Valley which is regarded as one of the garden spots of Pennsylvania, and nearby are some of the most scientifically managed apple and peach orchards of the State.

The remote location of the school stands in strong contrast with those in larger cities and college towns. Such an isolated

situation has a few disadvantages, compensated fully however, by many advantages which make it not only attractive but also convenient for the study of the objects and phenomena of the forests. It enables the student to study things rather than about things.

BUILDINGS.

Thirteen buildings comprise the Academy group. Wiestling Hall, the oldest of the buildings, is a large three-story structure and was formerly the residence of Colonel George B. Wiestling, a member of the first Forestry Commission of Pennsylvania. This building has recently been remodeled and is now used as an administration building. It also contains the dining room, kitchen, and quarters for the matron and servants.

The Main Building was erected in 1908-1909 at a cost of $30,000. It is the largest building of the group and constructed of a very attractive native quartzite. On the second floor of this building are comfortable living rooms for all the students and two members of the faculty. The first floor is devoted to class rooms, laboratories, and the library. In the basement are a soils laboratory, a large wood specimen room, and a furnace room. The entire building is supplied with steam heat, illuminated with electricity, and furnished with necessary toilet rooms and lavatories.

A double cottage, occupied by the Director and another member of the faculty, was built in 1911. Three other single cottages are occupied by an instructor, the forester stationed upon the Mont Alto State Forest, and a clerk. Other buildings, such as spring house, ice house, gas house, poultry house, garage, wagon house, stable, and seed storage house, dot the environs of the campus, and are all necessary features of the school because of its isolated location.

WIESTLING HALL.
The Original Building of the Present Academy Group.

THE FACULTY COTTAGE.

THE LARGEST BUILDING OF THE ACADEMY GROUP CONSTRUCTED OF AN ATTRACTIVE NATIVE QUARTZITE STONE.

CAMPUS.

A spacious and attractive campus surrounds the school buildings. Upon it are many native and introduced woody plants. The most distinctive and impressive features of the campus are the massive Black Oak, White Oak, Rock Oak, and Chestnut trees which are remnants of the original forest and bear mute evidence of many struggles and successes during an existence of more than two centuries. Amidst these stately trees are carefully laid out drives and walks, and a wandering brook of pure mountain water. Overlooking all this picturesqueness is the productive and carefully managed Mont Alto State Forest.

FACILITIES FOR INSTRUCTION.

The facilities at Mont Alto for instruction in forestry compare favorably with any in America. The laboratory equipment is modern and complete and the object lessons in the school forest, nursery, and arboretum are easily accessible and cover a wide range of forestry problems. The proximity of the school to its out-door working field economizes much time which would otherwise be spent on the road.

The biological, chemical, and soil laboratories are adequately equipped with modern appliances and fully stocked with necessary working material.

Numerous collections have been prepared and are available for demonstrating lectures, laboratory work, and special investigations. A herbarium of more than 4,000 specimens of native and exotic woody and herbaceous plants is carefully classified and available for study purposes. A collection of

forest tree fruits, seeds, and seedlings is in progress. Typical specimens of wood-destroying and parasitic tree fungi are on exhibition in a small museum. Many species of forest insects have been collected and specimens of their destructive work are available for study and demonstration purposes.

In the basement of the Main Building is a room 16x60 feet containing a collection of all the important commercial woods of the United States and some foreign woods. These woods are used in the course of Wood Identification. The room is equipped with wood-working tools and work benches.

A collection of tools, instruments, and machines used in lumbering, sylvicultural operations, protective work, and mensuration exercises is in progress. It contains planting hammers, fire torches, fire rakes, brush hooks and other implements designed by Pennsylvania and other American foresters. It also embraces representative European instruments.

The school is adequately equipped with the best and most practical instruments required in the practice of forestry. The surveying equipment discussed on page 36 is complete and up-to-date. The forest mensuration equipment comprises the best types of American and representative European calipers, hypsometers, increment borers, xylometers, chains, tapes, and other necessary instruments.

The library comprises all the standard texts on forestry in the English language and many publications in foreign tongues. All the principal forestry periodicals and representative lumber, trade, and technical journals are received regularly and filed systematically for future reference.

A large collection of carefully selected charts and photographs, covering all phases of forestal activities, is available for use and furnishes the best kind of illustrative material for class work. Lantern slides, covering the major forest operations and typical forest conditions, are in stock and are used to illustrate classwork.

For field work in forestry the vicinity of Mont Alto offers unsurpassed facilities. The latitude and topography favor a rich flora. It is the meeting ground of northern and southern species. The northern follow the mountains towards the South and the southern extend northward through the valleys. Within one mile of the school buildings occur more than 100 species of native woody plants and may introduced species. The richness of the local woody and herbaceous flora and its proximity to the school make it possible and practical to give the major part of the instruction in Tree Identification and Systematic Botany in the forest and nearby field without spending an excessive amount of time on the road.

A five-minutes walk from the school brings one to a forest nursery with an annual capacity of 2,000,000 seedlings. It is well equipped with modern nursery appliances, and in it the students learn, not by general observation but by actual work, nursery practice from the preparation and sowing of seed beds to the packing and shipping of seedlings and transplants.

The Mont Alto State Forest has been under careful and business-like management for the past seventeen years. It is dotted with plantations, experimental sample plots, improvement cuttings, fire towers, and ranger stations, ramified by roads and trails, covered with fire, compartment, and telephone lines, and partly divided into blocks, compartments, and stands. The plantations contain many different species of trees ranging in age from 1 to 17 years and cover an aggregate area of 499 acres. Improvement cuttings have been made annually since the creation of the forest. A study of the effect of light, medium, and heavy thinnings has been in progess for five years. One steel and two wooden towers have been erected at commanding lookout points. They and the ranger's houses are connected with the forester's headquarters by a state-owned metallic circuit telephone system, whose aggregate length is more than 26 miles.

The utilization operations are among the most interesting and instructive on the forest. Fuelwood, posts, and poles are harvested on a large scale. A state-owned portable sawmill, stave mill, shingle mill, and lath mill are operated on the forest. The students, as a part of their course in Lumbering, work upon these mills and learn to handle the different positions from felling the trees and firing the boiler to head sawyer and timber scaler. Briefly, the students are kept in constant contact with all the operations of a forest business, and taught the best and most efficient methods of handling a forest property both by precept and practice.

FACILITIES FOR RECREATION.

The faculty arranges annually a course of free lectures. These instructive and helpful talks are given to the students by men of prominence in subjects allied to forestry. They cover travel, history, civics, literature, first aid, wood craft, personal health, and other timely topics.

The student body maintains an athletic association. Athletic contests are not engaged in so extensively as at some other educational institutions because the students obtain sufficient physical exercise in their field work which takes them out of doors at frequent intervals during the entire year. A large baseball diamond, a double tennis court, a billiard table, and gymnastic equipment are available for use.

Basket Ball is the most popular game. It is especially adapted to a small student body and engaged in during the winter when field trips and forest exercises are few in number and of short duration. The schedule comprises games with normal schools and small colleges.

ALL-ABOARD FOR A FIELD TRIP

LUNCHEON IN THE WOODS.

PROMPT RESPONSE TO A FOREST FIRE CALL.

BASKET BALL TEAM

Hunting and fishing are among the most popular sports. The Mont Alto State Forest of 23,000 acres and adjoining forest properties and abandoned fields afford excellent and convenient hunting grounds. Within the forest is a game refuge of 2,000 acres in which wild animals and game birds are propagated systematically. Deer, opossums, raccoons, woodchucks, squirrels, rabbits, pheasants, and quail are plentiful, and wild turkeys and foxes are occasionally seen. It is not unusual to see a herd of fifteen deer, and occasionally a herd of 25 and in one instance 31 have been observed. During the 1915, 1916, and 1917 hunting seasons 59, 63, and 47 male deer respectively were shot on or near the Mont Alto State Forest. In spring time trout fishing offers an enjoyable form of recreation. The nearby mountain streams are numerous and well stocked.

Many points of historic interest are the objectives of week-end walking trips. Among these may be mentioned the Gettysburg and Antietam battlefields; President Buchanan's birthplace, and Pen Mar, a summer resort located on a high mountain at a point crossed by the Mason and Dixon line. Walks to local high points and commanding lookout towers are frequently scheduled. On the Mont Alto forest are one steel and two wooden towers 50 feet in height, affording excellent views of the extensive timbered mountain slopes and the fertile Cumberland valley, which is surpassed in Pennsylvania only by the Lancaster valley in its agricultural productive capacity.

PURPOSE.

The purpose of the Pennsylvania State Forest Academy is to prepare thoroughly trained foresters for the service of the State in its forests. The duties of a forester in the employ of the State require a thorough training and apprenticeship in

actual woods work, besides the usual school studies in forestry, the sciences, and a number of cultural subjects. The forester must have an equipment covering the surveying and mapping of his forest; the growing of trees and their proper management from planting, through thinning, to final logging and sawing; the protection of the forest from its arch-enemy, the forest fire, as well as from insects, disease, and trespass; the building and improvement of the forest roads, trails, fire-lines, telephone lines, and fire towers; the estimate of timber and the calculation of its growth, value, and financial returns; the directing of labor; the keeping of records and accounts; and some knowledge of business and forest law. This requires an underlying training in mathematics, botany, zoology, chemistry, physics, geology, and soils, as well as history, language and economics.

The practical application of this training is the large feature of the school, for the entire course may be said to be given in the 23,000 acres of the Mont Alto State Forest in which the school is located. All the activities of the forester are followed in the woods from the growing of trees from seed in the nursery, to the grinding of the forest student's own axe, the cutting of undesirable trees into cordwood, and the mature trees into saw-logs, as well as their manufacture into lumber, lath, staves, and shingles on the school mills; from the day and night fighting of forest fires and the pick and shovel building of roads to the preparation of a thorough working plan for a specified tract of forest land.

But beyond all this technical training, the school aims to develop men who love the forest, for a successful forester must look upon the forest as more than a mere clump or collection of trees. He must see in it a complex community or society of living things and be on a speaking acquaintance with them all. He should know the wild animals, birds, plants, and rocks so well that he finds interest in them. A good

forester should not be lonesome in the forest, but instead find continuous contentment in his extensive out-door laboratory.

Last, but not least, the school aims to graduate men who love the people of the forest, if not for what they are, at least for what he hopes they will become. A forester must be a man of parts with whom the people of the forest communities are glad to associate, willing to do ordinary business on a reliable basis, and discuss everyday problems with interest and benefit.

ADMINISTRATION.

The control of the school is vested by legislative enactment in the Commissioner of Forestry. The pedagogical supervision and immediate government is delegated to a director who resides at the institution and takes an active part in the instruction of the students.

DEGREE.

The degree of Bachelor of Forestry is conferred upon the successful completion of the prescribed courses of studies.

THE SCHOOL YEAR.

The school year is divided into first, second, and summer terms. The first term begins on the first Tuesday of September and extends to the middle of December, when the Christmas recess begins. The second term begins the first Tuesday in January and extends to the end of May. The summer term begins immediately upon the termination of the second term

and extends to the middle of August when a two-weeks recess begins. The school year thus covers about forty-six weeks, and the entire course of three years represents 136 weeks of actual work, which is considerably more than is given in many four-year forestry courses.

THE FOREST CLUB.

The Rothrock Forest Club is a student organization named in honor of Dr. J. T. Rothrock, the founder of the school, and for many years the prudent leader and now the wise counsellor of the Pennsylvania Department of Forestry. The meetings are held in Log Lodge, a commodious log building finished in southern yellow pine and heated by a spacious fire place. The program of the meetings is similar to that of literary societies at other educational institutions. The club is also the agency through which the students are introduced to prominent men in forestry and other professions.

ENTRANCE REQUIREMENTS.

WHO MAY BE ADMITTED? Only citizens of Pennsylvania who are 18 years of age and under 25 on the first day of September, in the year in which the applicant is admitted.

THE PROSPECTIVE STUDENT must make application on a blank form to be furnished by the Commissioner of Forestry, Harrisburg, Pennsylvania.

METHOD OF ADMISSION. Admission can be gained only by examinations. No certificates are accepted. The first or preliminary examination consists of two parts, viz: a physi-

cal examination and a test in scholarship, and usually occupies two days. The physical examination is held the first day and if the applicant discloses satisfactory conditions, he is admitted the following day to the test in scholarship, which covers the following branches: English (Grammar, Composition, and Rhetoric), United States History, Civil Government, Arithmetic with special emphasis on Mensuration, Interest, Proportion, and Progression, Algebra (to and including pure and affected quadratic equations), Plane Geometry, and Biology (including Human Physiology).

As a result of the mental and physical examinations and the report of the examiners to the Commissioner of Forestry, the first fifteen men in the group of those examined will be assigned to Pennsylvania foresters on State Forests for practical work and instruction, during a period of two months, beginning about July first. At the end of this period the fifteen men so selected will assemble at a designated place where they will be subjected to a final examination which covers the probationary period spent on a State Forest. As a result of this test and the recommendation of the foresters in whose charge the applicants served, ten men of the group who pass the best examination in practical work will be nominated by the Commissioner of Forestry for admission to the Forest Academy the following September. Applicants will bear their own expenses while on a State Forest for the two-month period.

CONTRACT AND BOND: Each successful applicant receiving an appointment must enter into a contract with the Commonwealth of Pennsylvania for the proper fulfillment of his duties at the Forest Academy during the full course of three years, and then that he will enter the employ of the State after graduation, if his services shall be required. He must also furnish with his contract a bond in the sum of

$500 with sureties to be approved by the Commissioner of Forestry, conditioned that he will faithfully execute his contract. Sureties, if individuals, must be two in number, and show fee simple ownership of Pennsylvania real estate with an equity above all incumberances of at least the amount of the bond.

EXPENSE: The student will furnish his own clothing for out-door work, which should be plain, heavy, and strong, and such other clothing of a better character as he may desire to have. He will also bear his incidental expenses, which may be little or great, as he chooses, furnish his own soap and towels, procure such technical textbooks and instruments at his own expense as may be directed from time to time, and have available a sufficient sum of money to cover the expense of trips to neighboring State Forests, other nearby forested areas, and local wood-using industries.

SERVICE AND SUPPLIES FURNISHED BY THE STATE: Each student will be furnished by the State, free of charge, his tuition, board, room, room outfit, bed clothes, stationery, and plain washing.

DEPOSIT: When a student enters the Academy he must make a deposit of $5.00 in money with the Director, against which will be charged all items of unnecessary, careless, or wilful breakage or damage to State property. Whenever a deposit is lowered by reason of charges against it, the student will be required to increase the deposit at the beginning of each school year to the full amount of $5.00. At the time of graduation there will be returned to him whatever balance may remain to his credit.

Counting and Bundling Seedlings in the School Forest Tree Nursery.

An Exercise in Forest Mensuration. Counting the Annual Rings on the Cross Section, and Determining the Contents of a Felled White Pine Tree.

A Real Test in Tree Identification Out in the Forest.

A LABORATORY EXERCISE IN SOILS.

ORDER OF STUDIES.

FIRST YEAR.

First Term.	Second Term
(1) English	(1) English
(2) German I	(2) German I
(7) General Physics	(8) Meteorology
(5) General Chemistry	(5) General Chemistry
(14) Botany I	(15) Botany II
(21) Beginner's Forestry	(43) Trigonometry

Summer Term—(42) Nursery Practicum, Improvement Cutting, (22) Forest Geography, (16) Botany III, and (23) Tree Identification.

SECOND YEAR.

First Term.	Second Term
(23) Tree Identification	(24) Dendrology
(26) Wood Identification	(30) Forest Mensuration
(25) Wood Morphology	(39) Silviculture I
(17) Botany IV	(18) Forest Pathology
(10) Geology	(20) Forest Entomology
(11) Introductory Soils	(12) Forest Soils and
(6) Forest Chemistry	(13) Soil Surveying
	(19) Zoology

Summer Term—(30) Forest Mensuration and (40) Sylviculture II.

THIRD YEAR.

First Term.	Second Term
(33) Forest Finance	(37) Forest History
(31) Forest Organization	(31) Forest Organization and
(41) Silviculture III	(32) Working Plans
(38) Forest Protection	(34) Forest Administration
(27) Wood Utilization	(35) Business Law
(4) General Economics	(36) Forest Economics and Policy
(44) Surveying	(28) Forest Utilization and
(3) German II	(29) Lumbering
	(45) Roads
	(44) Surveying
	(9) Forest Mechanics

Summer Term—(44) Surveying, and (45) Roads.

DESCRIPTION OF COURSES.

(1) ENGLISH. The course proposes to develop in the student an appreciation for good literature and to train him in adapting the best usages of the language to his own needs. It includes a review of English grammar and rhetoric, more or less intensive study of several of the best authors, and constant drill in analysis and composition; considerable attention is given to business forms and correspondence, public speaking, and writing for publication; extemporaneous speaking is a part of the regular class work. Throughout, the course insists upon clear thinking and direct, forceful expression. Lockwood and Emerson's *Composition and Rhetoric* is the text used. Three hours, first and second terms. Mr. Evans.

(2) GERMAN I. A course comprising a careful drill in pronunciation and in the principles of German grammar and syntax. Thomas' *Practical German Grammar* and such other texts as may be recommended. Three hours, first and second terms. Mr. Harris.

(3) GERMAN II. An elective course in German forestry literature of prominent authors. Hausrath's *Der Deutsche Wald* is the main text used. Three hours, second term. Mr. Illick.

(4) GENERAL ECONOMICS. A study of the principles of economics and their modern applications. Extended reference work among different authors is required, also the examination of current literature having to do with problems of an economic nature. Discussion of governmental questions and activities along economic lines is encouraged. Bullock's *The Elements of Economics* is the text used. Three hours, first term. Mr. Evans.

(5) GENERAL CHEMISTRY. A course comprising a short series of introductory lectures on the historical development of the science, and a general consideration of the occurrence, preparation, properties, reaction, and uses of the common elements. This is followed by a more thorough study of the properties and reaction of the common elements and acids, their detection in various liquid and solid mixtures, and the principles involved in the preparation and use of volumetric solutions and in the work of gravimetric analysis. Special emphasis is laid on carbon compounds in preparation for the course in Forest Chemistry. Smith's *General Chemistry* is the text used. Five hours, first and second terms. Mr. Deatrick.

(6) FOREST CHEMISTRY. The course consists of introductory lectures on the development of the subject of the nutrition and chemical composition of plants, followed by a consideration of the derived forest products, and destructive distillation, naval store, and wood preservation industries. The preparation of birch, wintergreen and pine needle oils, vegetable dyes, and other similar forest products, and their properties, reactions, and relations are fully treated. Four hours, first term. Mr. Deatrick.

(7) GENERAL PHYSICS. This course aims to give the student a working knowledge of the fundamental principles of physics by developing them from familiar facts and phenomena. The application of the commoner principles is demonstrated on trips to industrial plants, and illustrated with implements and machines used in forestry. The course aims primarily to prepare the student for the courses in Meteorology and Forest Mechanics. The laboratory exercises cover the proper-

ties of matter, heat, light (including elementary photography), sound, magnetism, and electricity. Four hours, first term. Mr. Deatrick.

(8) Meteorology. A general consideration of the phenomena of the atmosphere, their explanation and the forecasting of the weather. United States weather maps are received and studied from day to day. Two experiment stations are maintained, one in the forest and another in the open, where daily readings of maximum-minimum thermometers and rain gauge readings are made by the students. Practical field work and special lectures in forest influences are given in connection with this course. Milham's *Meteorology* is used as a text. Four hours, second term. Mr. Deatrick.

(9) FOREST MECHANICS. A study of the general principles of the construction, operation, and repair of machines, engines, boilers, telephone systems, fire towers, and appliances that a forester has occasion to use. Trips of inspection are taken to neighboring manufacturing and engineering plants, sawmills, and woodworking establishments. The students are given practical experience in the construction of telephone lines, cabins and fire towers, and in the setting up and operation of portable sawmills. One hour lecture and twenty-five hours of field work, second term. Mr. Deatrick.

(10) GEOLOGY. The object of this course is to furnish a fundamental knowledge of geologic principles and to prepare the students for work in soil technology. An elementary review of the geological history of the earth, with special attention to structural and dynamic geology is followed by a detailed study of rock weathering and the classification of physiographic and soil provinces. The laboratory exercises are designed to teach recog-

nition of the common soil-forming rocks and minerals; their composition and mode of origin; and decomposition products. Field excursions, and the study of topographic maps emphasize the influence of the forces of weathering on the formation of the various soils. Tarr's *Elementary Geology* is the text used. Four hours, first term. Mr. Deatrick.

(11) INTRODUCTORY SOILS. A course including the study of (1) the classification of soils; (2) mechanical and chemical analyses; (3) physical, chemical, and physical-chemical properties; (4) moisture and its control; (5) soil biology; (6) the management of soils for increased production. The laboratory work is designed to demonstrate fundamental physical relations with special emphasis on the collodial nature of organic soils. Lyon, Fippin, and Buckman's *Soils: Their Principles and Properties* is the text used. One hour recitation and three hours laboratory, first term. Mr. Deatrick.

(12) FOREST SOILS. An advanced course in which the chemical, physical, and biological phases of the organic matter in the different forest soils are considered from the point of view of economic factors of forest production. The laboratory work consists of an examination of the microbiological flora of forest soils and experiments to demonstrate (1) the rôle of microorganisms in soil fertility, (2) the decomposition of organic matter, and (3) the metabolism of the carbon, nitrogen, and sulphur cycles. The field work is designed to show the effect of the soil factors on the choice of tree species in artificial regeneration and to classify the different forest soils on the basis of the existing vegetation. The outline of the course follows Rauman's *Bodenkunde.* Three hours, first part of second term. Mr. Deatrick.

(13) SOIL SURVEYING. The course is designed to give a working knowledge of the methods employed in the preparation of reconnoisance and detailed soil surveys of forest areas and to acquaint the students with the fundamentals of site qualities as used in forest organization. Field exercises in plane tabling, the determination of soil types and their mapping on prepared or topographic maps are distinct features of the course. A specified part of a State Forest is mapped each year. Two entire weeks, latter part of second term. Mr. Deatrick.

(14) BOTANY I. (THE STRUCTURE AND FUNCTIONS OF PLANTS). A course specially adapted to the early and fundamental training of a forester. It comprises a study of the external and internal morphology of the seed-bearing plants with special reference to the fruit, and the root, stem, and leaf systems. This is followed by a discussion of the life processes of plants, such as absorption, conduction, transpiration, and photosynthesis. Part I of Ganong's *A Textbook of Botany for Colleges* is the text used. Two hours lectures and three hours laboratory, first term. Mr. Harris.

(15) BOTANY II. EVOLUTION OF THE PLANT KINGDOM. A careful study of representative examples among the algae, fungi, liverworts, mosses, ferns and their allies, gymnosperms, and angiosperms, with special emphasis on the form of plant parts, and a comparison of them in the different groups. Special attention is also given to the alternation of generations in the plants studied, and in working out their life histories, the progression and retrogression of certain organs and phases in proceeding from the lower to the higher plants are noted. Part II of Ganong's *A Text-*

book of Botany for Colleges is the text used. Two hours lectures and three hours laboratory, second term. Mr. Harris.

(16) BOTANY III. TAXONOMY. A comparative study is made of the families of flowering plants, and special training is given in the methods of collection and preservation of material. Each student is required to identify and make an herbarium of at least 150 species of herbaceous plants. Gray's *New Manual of Botany* and Britton and Brown's *Illustrated Flora of the Northern States and Canada* are the text and reference used. One hour lecture, and ten hours laboratory or field work during April, May, and June. Mr. Harris.

(17) BOTANY IV. PLANT ECOLOGY. The course deals with the relation of plants to their environment. First, there is a study of the ecological factors, which in general are grouped under physical, climatic and biotic factors. This is followed by a discussion of succession, the struggle for existence among plants, the laws of migration, the analysis of vegetative forms and structures, plant formations and societies.

In the laboratory different members of the plant are studied as to their special functions and their relation to environment. The stem, root, leaf, flower, etc., are carefully examined and their ecological relations pointed out.

The Forest Academy is very favorably located for the field study of Plant Ecology, as a great variety of plant life conditions may be found in the immediate vicinity of the school. Therefore, students are able to work in the adjoining fields and forests, which is a decided advantage over the studying of plant life processes in the laboratory. Two hours lectures, and three hours field work or laboratory, first term. Mr. Harris.

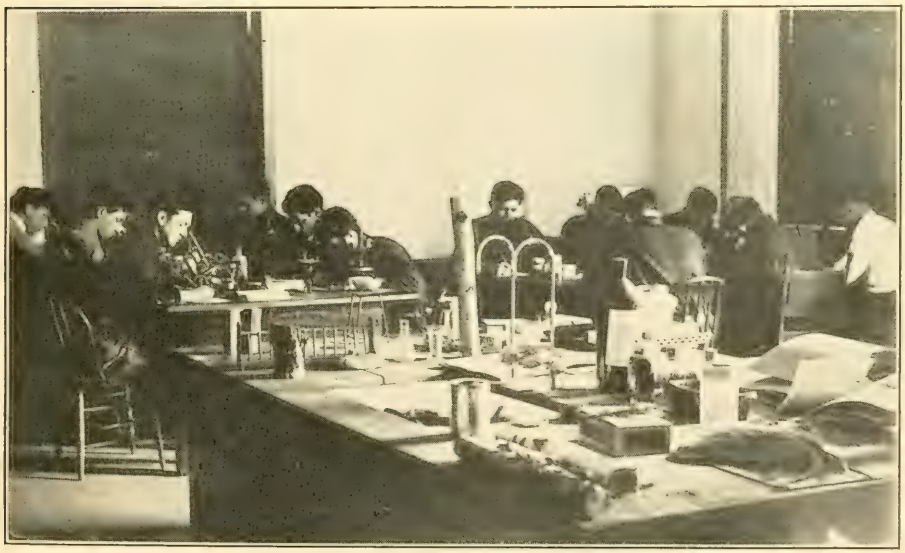
(18) FOREST PATHOLOGY. A course considering representative tree diseases caused by Cryptogamic parasites and saprophytes, and parasitic flowering plants. Preventive and remedial measures for checking their damage are discussed. Class and laboratory work are supplemented by field exercises. Three hours, second term. Mr. Harris.

(19) ZOOLOGY. In this course a general survey is made of the animal kingdom from the Protozoa to the Vertebrata. The classification and distribution of animals both in regard to time and space, the structure and development of cells, tissues, and organs, regeneration, effects of environmental factors as determining form, organic evolution, and heredity are studied. The lectures are well illustrated by over 100 invertebrates carefully identified and preserved, by several hundred slides showing the various kinds of cells, tissues and organs as well as their development. In the laboratory each student dissects an animal typical of each phylum and makes drawings of parts observed. Two hours lectures and three hours laboratory or field work, second term. Mr. Harris.

(20) FOREST ENTOMOLOGY. A general discussion of the morphology, physiology, development, and classification of insects; the life history of both beneficial and injurious species, with special reference to those forms which are of economic importance in the forest. Two hours, second term. Mr. Harris.

(21) BEGINNER'S FORESTRY. A course aiming to lay a broad foundation for the later and more specific courses in forestry. Special emphasis is laid upon field work in the State Forest of 23,000 acres adjoining the school, which is generally regarded as the best developed and

OPERATING A TRANSIT DURING AN EXERCISE IN FOREST SURVEYING.



IN THE BOTANICAL LABORATORY.

ESTIMATING TIMBER

MEASURING THE HEIGHT OF TREES WITH DIFFERENT HEIGHT MEASURING INSTRUMENTS.

most instructive in Pennsylvania. Upon it are many plantations, improvement cuttings, sample plots, fire towers, telephone and compartment lines, established within recent years. Each student is required to prepare a written report of every field trip, which report is corrected and returned. Moon and Brown's *Elements of Forestry* is used as a text. Four hours, first term. Mr. Retan.

(22) FOREST GEOGRAPHY. The course aims to give a survey of the Forest Regions of the world. It comprises lectures on the ecological and economical features of tropical and sub-tropical forests; a brief description of temperate forest regions; a detailed study of the forest regions and types of the United States. Two hours, summer term. Mr. Retan.

(23) TREE IDENTIFICATION. A field course embracing the study of the woody vegetation in the vicinity of Mont Alto, where more than 150 species of native trees and shrubs are found. The woody flora about Mont Alto embraces northern species which follow the mountains towards the south and southern species which extend northward through the Cumberland valley. More than 100 different species of native woody plants are found within 15 minutes walk of the school. Many introduced species are accessible for study in the plantations of the Mont Alto State Forest, and in the school nursery and arboretum.

This course consists almost entirely of field work. An afternoon of each week is spent in nearby forests and fields, and at irregular intervals a day or a week-end trip is taken to nearby points of special dendrological interest, such as the Gettysburg battlefield and the banks of the Potomac river. Field tests cover about 700 speci-

mens annually, representing almost 200 different species. A collection of winter twigs mounted on cards, and keys based on winter and summer characteristics are required. Illick's *Check-list of Woody Plants near Mont Alto* and Illick's *Pennsylvania Trees* are used as texts. Seven hours during latter part of summer term, and 4 hours first term. Mr. Illick.

(24) DENDROLOGY. A general systematic and biological study of the forest trees of the United States and the commoner introduced species, with special reference to important timber trees. Particular attention is given to their distinguishing characteristics, occurrence, and geographical distribution. Three hours, second term. Mr. Illick.

(25) WOOD MORPHOLOGY. A study of the microscopic structural features of wood. Representative type specimens of the conifers and broad-leaved trees are studied in detail with compound microscopes in order to determine the occurrence, form, and structure of the wood elements. All structural features, which are of value in distinguishing the different woods, are studied under the simple and compound microscopes from cross, radial, and tangential sections of the different woods. Record's *Identification of the Economic Woods of the United States* and Jeffrey's *The Anatomy of Woody Plants* are used as texts and references. Three hours, first term. Mr. Harris.

(26) WOOD IDENTIFICATION. A practical workroom course in the visual identification of the important commercial woods of the United States. It considers primarily the macroscopic features of woods and supplements the course of *Wood Morphology* which covers the microscopic characteristics. A workroom 16x60 feet

supplied with work-benches and tools and containing a collection of all the important American and many foreign woods affords the student an excellent means of acquainting himself with the common woods of the market. Weekly tests are held in the work room, and occasionally wood specimens are included in the field tests of the companion course of Tree Identification. Three hours, first term. Mr. Illick.

(27) WOOD UTILIZATION. This course considers the uses of wood, their physical properties, and the most important wood-using industries. It aims to point out the interrelation between the distinctive properties and price of each wood, to show the adaptability of certain woods to specific uses, and indicate how the wood of inferior species may be used advantageously. *Wood-using Industries of Pennsylvania* and other states, and Record's *Mechanical Properties of Wood* are used as references and texts. Two hours, first term. Mr. Evans.

(28) FOREST UTILIZATION. This course aims primarily to lay a foundation in the principles of lumbering by acquainting the students with past, present, and future methods of logging in the United States and in foreign countries. Special emphasis is given to methods of lumbering now applicable to the forests of the State of Pennsylvania. Nearby lumbering operations are studied and reported. The course also considers the harvesting of such accessory forest products as clay, sand, bluestone, ganister rock; and such minor forest products as leaf litter, leaf fodder, and tree fruits for human, animal, industrial, and nursery uses. Four hours, second term. Mr. Evans.

(29) LUMBERING. A practical course in logging and lumber manufacture. Each student works at all positions

from the marking and felling of trees through the sawmill operations to the stacking of the finished material in the yard. A school sawmill, shingle mill, stave mill, and lath mill afford an excellent and continuous opportunity for practical experience. A comparative study of log rules, the scaling of logs, the determination of the contents of logs, and the ascertaining of mill factors are special features of this course. Two to three entire weeks, second term. Messrs. Staley and Evans.

(30) FOREST MENSURATION. A course of lectures, recitations, field work, and office work in commercial and scientific methods of measuring the contents of stands, standing and felled trees, and parts of single trees. The principles of timber estimating, log scaling, and lumber inspection are considered. Growth studies and tree analyses are special features of the course. Volume, form-factor, and yield tables are constructed.

Special exercises have been prepared for the field work covering chaining, calipering, height growth, volume growth, estimating height, diameter and volume, and determining the volume of stands. A school sawmill, shingle-mill, stave mill, and lath mill are available and permit the working out of many practical problems, particularly mill and waste factors. A practical xylometer is used in the accurate determination of volume. Graves' *Forest Mensuration* is used as a reference text; outlines or field problems are supplied. Two hours, second term, and practically the full time of the summer term. Mr. Illick.

(31) FOREST ORGANIZATION. A course aiming to direct the activities of a forest in such a manner that the products derived therefrom will be used in a profitable way and removed in accordance with a prescribed fell-

ing budget contemplating a continuous yield management. Consideration is given to the fundamental principles underlying the subject, the increment of stands, yield tables, forest capital, maturity and rotation, normal forest, and the determination of the felling budget.

Upon the completion of the theoretical part of the subject the applied part is taken up, which consists almost entirely of field work and the compilation of field data. Each class is required to make geometric, quantitative, and qualitative surveys of a specified forest area which form the basis of a working plan. A portion of a State Forest is annually divided into compartments and the stands thereon are differentiated on the basis of age, species, density, site-quality, and sylvicultural system. The preparation of stand and age-class maps are also features of the course. Roth's *Forest Regulation* and Recknagel's *Theory and Practice of Working Plans* are used as texts and references. Three hours first term, and four hours first part of second term. Mr. Illick.

(32) FOREST WORKING PLANS. This course, immediately follows Forest Organization, and is designed especially to give practical training in the preparation of concise reports containing prescribed instruction for the conduct of operations on a forest property. Each student is required to prepare a report for a specified forest area. Three lecture and recitation hours latter half of second term and sixty hours of field work. Mr. Illick.

(33) FOREST FINANCE. The course includes Forest Valuation and Forest Statics. The work in Forest Valuation is prefaced by a careful review of fundamental interest formulae. The valuation of the producing factors,

Cost Value, and Expectation Value, are considered. Especial emphasis is laid on the determination of damages and the factors influencing the future value of forest products. In Forest Statics the differentiation of absolute forest land from agricultural and grazing land is stressed. Special lectures are given on the Soil Rent and Forest Rent theories. A considerable portion of the courses is devoted to typical American forestry and lumbering problems. Roth's *Forest Valuation* is the text used. Three hours, first term. Mr. Retan.

(34) FOREST ADMINISTRATION. This course is designed to cover the principles and methods employed in the administration of forest properties. The organization of the personnel and the methods of conducting the forest business in different countries and states is discussed. Special emphasis is given to the administrative problems pertaining to the State forests of Pennsylvania. A study of the special forms used by the Pennsylvania Department of Forestry in the conduct of its business comprises a significant part of the course. One hour, second term. Mr. Illick.

(35) BUSINESS LAW. An elementary course in the principles of law as met with in the business of forestry. Huffcut's *The Elements of Business Law* is the text used. Kinney's *Essentials of American Timber Law* is used for cases and readings. Three hours, second term. Mr. Retan.

(36) FOREST ECONOMICS AND POLICY. A course of lectures treating the forest problem from a economic point of view, and the principles of a rational forest policy. It aims to show the needs and results of forestry, and discusses the functions of the National Government, the State, Counties, Municipalities, and Com-

Using an Increment Borer to Determine the Age of a Tree.

Measuring the Height Growth of Young Scotch Pine Trees.

STUDENTS MAKING A STUDY OF THE CHESTNUT SHINGLE BUSINESS.

A TEST IN WOOD IDENTIFICATION.

munities relative to forestry. Fernow's *Economics of Forestry* is used as a reference. Three hours, second term. Mr. Retan.

(37) FOREST HISTORY. A course giving the development of the forestry idea in foreign countries and in the United States, particularly Pennsylvania. It considers the forest conditions and laws in colonial times, the early botanists, the primaeval forest of the State, the beginning and development of lumbering, the "Fathers of Pennsylvania Forestry," the history of the State Forest Academy, and the achievements of its alumni. Fernow's *History of Forestry* is the text used, supplemented by lectures and readings in Kinney's *Development of American Forest Law.* Two hours, second term. Mr. Retan.

(38) FOREST PROTECTION. A detailed discussion of the grazing and the fire problems, particularly adapted to the conditions prevailing in the Pennsylvania forests. A complete fire protective system is planned and worked out for a specified forest area. Effective methods of preventing and controlling forest fires and the use of practical firefighting tools are emphasized. Forest fire laws and protective measures of other states and countries are considered. Public education is discussed.

The field work consists in part of trips to various parts of the Mont Alto and neighboring State Forests for the study of the existing protective systems and the effect of grazing, frost, heat, erosion, and other destructive agents. The entire student body participates actively in the extinguishing of all fires which occur upon the Mont Alto State Forest and adjoining forest properties. This affords the best possible training in the most

important phase of present-day forestry. A two-ton Bessemer truck, fully equipped with fire-fighting tools, is continuously kept in readiness to transport the students to the fires. A special forest fire wagon and a number of saddle horses are also available for use. Three hours, first term, Mr. Retan.

(39) SILVICULTURE I. FOREST ECOLOGY. A course discussing the effect of the atmosphere, heat, light, wind, and soils, on tree growth and distribution; effect of the forest on the soil and climate; forest types, their description and distribution; the internal struggle of the stand; stand description. Schlich's *Silviculture* and Mayr's *Waldbau* are the references used. Three hours lectures and three hours field work, second term. Mr. Retan.

(40) SILVICULTURE II. SEEDING AND PLANTING. Seed production and collection. Nursery work and administration. Direct seeding and planting. In addition to the regular field work of this course, directed towards the study of reforestation problems, the class performs all the different operations in the Mont Alto nursery, which has a capacity of 2,000,000 seedlings per year and affords an opportunity of familiarizing the students with all nursery problems. The students also take an active part in planting on the different State Forests during each of the three school years. Toumey's *Seeding and Planting* is the text used. Two hours lectures and three hours field work, summer term. Mr. Retan.

(41) SILVICULTURE III. REGENERATION SYSTEMS. A critical study of pure and mixed woods; high and low forests; natural seeding systems; coppice wood management; the woodlot; cleanings, thinnings, and im-

provement work. Each year the students make a number of experimental cleanings and thinnings. A large number made in previous years is now yielding unexcelled material for instructional work. Graves' *Principles of Handling Woodlands.* Schlich's *Silviculture,* and Mayr's *Waldbau* are used as references. Two hours lectures and two hours field work, first term. Mr. Retan.

(42) NURSERY PRACTICUM. Each year considerable time is spent by the students in the nearby forest tree nursery with a bed area of over three acres. Considerable practice is obtained in each operation from spading the beds to shipping the trees. Costs are calculated for all work done, and nursery forms and accounting methods explained. Problems in nursery management and supervision are discussed in detail. The students also participate in experimental work which is constantly in progress, and members of the Senior class are given experience in directing work. Specially designated days, summer term. Mr. Retan.

(43) TRIGONOMETRY. The course covers trigonometric analysis, right and oblique triangles, and the use of logarithms and trigonometric tables in the solution of problems. Phillips and Strong's *Elements of Trigonometry* is the text used. Three hours, second term. Mr. Evans.

(44) SURVEYING — PLANE AND TOPOGRAPHIC; MAPPING. A course including compass and transit surveying; levelling with spirit level and barometer; plane-table and traverse-table work; stadia measurements; triangulation; practice in land surveying, particularly in tracing and re-running old lines; laws and customs applying to land surveying; care, testing, and

adjusting of instruments. Tracy's *Plane Surveying* is the text used. The equipment consists of Young engineer's transit; Gurley Engineer's transit with gradienter; two Randolph Mountain transits; plane-table, telescopic alidade with stadia; two traverse boards; two Wye levels, one 16 inch and one 18 inch; open sight compasses; barograph and aneroid barometers; standardized steel tape with spring balance attachment; tapes, chains, level rods, and all necessary drafting equipment, including polar planimeter, pantographs, and blue-printing outfits. Two hours recitation, five hours field work, and drafting, first and second terms, followed by 10 weeks of topographic surveying and mapping. Mr. Evans.

(45) ROADS. A course of lectures and references covering the history and development of road building; traction principles and grades; drainage; purpose and location of forest roads with particular reference to Pennsylvania conditions; construction and cost of surfaced and dirt roads. The field work consists of location surveys of mountain road; grading and draining; examination of modern surfaced and dirt roads in mountain districts. Two hours, second term. Mr. Evans.

A LESSON IN SAW-FILING.

STUDYING THE OUTPUT OF A PORTABLE SAWMILL.

GRADUATES.

Name	Class	Address.
Avery, John E.,	1906	Notch, Pike Co., Pa.
Baer, Charles E.,	1915	Elimsport, Lycoming Co., Pa.
*Barnes, Leonard G.,	1914	Pleasant Gap, Centre Co., Pa.
Bartschat, Walter J.,	1914	Troxelville, Snyder Co., Pa.
Bastian, John A.,	1909	Mount Union, Huntingdon Co., Pa.
Bearer, Valentine M.,	1913	Ligonier, Westmoreland Co., Pa.
Bietsch, Tom O.,	1908	McAlveysfort, Huntingdon Co., Pa.
*Blouse, Joseph R.,	1916	Wrightsville, York Co., Pa.
Bodine, Alfred W.,	1910	Mt. Union, Huntingdon Co., Pa.
*Breneman, Howard E.,	1917	Hollidaysburg, Blair Co., Pa.
Brock, Ralph E.,	1906	3857 Carnegie Ave., Cleveland, Ohio.
Bryner, Harold E.,	1908	New Germantown, Perry Co., Pa.
*Buch, J. Edward,	1917	Lititz, Lancaster Co., Pa.
Byers, William L.,	1906	Rainsburg, Bedford Co., Pa.
Conklin, Robert G.,	1906	Fayetteville, R. D. No. 2, Franklin Co., Pa.
*Conklin, W. Gardiner,	1908	Department of Forestry, Harrisburg, Pa.
*Critchley, Horace F.,	1913	North Bend, Clinton Co., Pa.
Dague, William F.,	1908	Clearfield, Clearfield Co., Pa.
Detz, Lewis M.,	1916	Coburn, Centre Co., Pa.
Dutlinger, Forrest H.,	1908	125 9th St., Renovo, Clinton Co., Pa.
Elder, John R.,	1913	Deceased.
Elliott, Harry E.,	1909	Sizerville, Cameron Co., Pa.
Emerick, R. Lynn,	1909	Coudersport, Potter Co., Pa.
Evans, Horace C.,	1908	Lafayette Hill, Montgomery Co., Pa.
Evans, W. Boyd,	1912	Mont Alto, Franklin Co., Pa.
Fawley, J. Russell,	1914	Wissahickon, Philadelphia, Pa.
Fox, P. Hartman,	1911	Austin, Potter Co., Pa.
Funk, Nathaniel B.,	1912	Waynesboro, Franklin Co., Pa.
Golden, Thomas H.,	1913	Syracuse, N. Y.
Harbeson, Thomas C.,	1914	Lloyd, Tioga Co., Pa.
*Harlacher, Josef B.,	1917	East Berlin, Adams Co., Pa.
Heintzleman, B. Frank,	1907	U. S. Forest Service, Eugene, Lane Co., Oregon.

*In Military Service, U. S. Army.

GRADUATES—Continued.

Name	Class	Address.
Hogeland, Charles C.,	1916	Department of Forestry, Harrisburg, Pa.
*Hogentogler, Joseph R.	1912	Loganton, Clinton Co., Pa.
*Horning, W. Harold,	1914	Karthaus, Clearfield Co., Pa.
*Houpt, W. Elmer,	1909	Aitch, Huntingdon Co., Pa.
*Houtz, Jesse M.,	1913	Orwigsburg, Schuylkill Co., Pa.
*Irvin, James A.,	1912	Altoona, Pa.
Jerald, Frank D.,	1910	Deceased.
Keller, John W.,	1910	Boalsburg, Centre Co., Pa.
Kirk, Carl L.,	1909	Penfield, Clearfield Co., Pa.
Kraft, William H.,	1906	Deceased.
*Leach, Walter,	1914	Department of Forestry, Harrisburg, Pa.
Ludwig, Walter D.,	1910	Johnstown, Cambria Co., Pa.
MacAvoy, John L.,	1911	Care of Lehigh-Portland Cement Co., Albany, N. Y.
McCool, B. B.,	1913	203 E. 47th St., Portland, Oregon.
McNaughton, Nelson R.,	1911	Department of Forestry, Harrisburg, Pa.
*McNeal, James E.,	1907	Reading, Pa.
*McNulty, Leighton E.,	1917	Chambersburg, Franklin Co., Pa.
*McPherson, Benj. D.,	1916	Department of Forestry, Harrisburg, Pa.
*Meek, Charles R.,	1912	Coburn, Centre Co., Pa.
Metzger, Homer S.,	1909	Loganton, Clinton Co., Pa.
*Middour, J. Calvin,	1916	Fayetteville, R. D. No. 2, Franklin Co., Pa.
*Miller, Edwin B.,	1917	Chambersburg, Franklin Co., Pa.
Miner, Clement C.,	1910	Venango, Crawford County, Pa.
*Montgomery, W. Erdmann,	1913	Mont Alto, Franklin Co., Pa.
Morgan, Howard H.,	1915	Slate Run, Lycoming Co., Pa.
*Morton, J. Newton,	1916	Department of Forestry, Harrisburg, Pa.
Morton, T. Roy,	1908	Petersburg, Huntingdon Co., Pa.

*In Military Service, U. S. Army.

GRADUATES—Continued.

Name	Class	Address.
*Moyer, Marvin H.,	1916	Telford, Montgomery Co., Pa.
Mueller, Harry J.,	1909	Buffalo, N. Y.
Mulford, Paul H.,	1907	Asaph, Tioga Co., Pa.
Muller, Max E.,	1913	Hammersleyfork, Clinton Co., Pa.
Mumma, Walter M.,	1911	Steelton, Dauphin Co., Pa.
*Musser, Ralph W.,	1917	Altoona, Pa.
Mustin, Maurice,	1912	915 S. 50th St., Philadelphia, Pa.
Neefe, Robert R.,	1913	Waterville, Lycoming Co., Pa.
Perry, George S.,	1913	Aitch, Huntingdon Co., Pa.
*Port, Harold F.,	1916	Asaph, Tioga Co., Pa.
*Powers, James E.,	1915	Pine Grove Furnace, Cumberland Co., Pa.
Retan, George A.,	1909	Mont Alto, Franklin Co., Pa.
*Robinson, Milton O.,	1912	Orland, Glenn Co., California.
*Root, Lloyd D.,	1917	Beccaria, Clearfield Co., Pa.
*Rowland, Horace B., Jr.,	1915	Department of Forestry, Harrisburg, Pa.
Rupp, Alfred E.,	1909	Fort Loudon, Franklin Co., Pa.
Ryon, James B.,	1912	East Orange, New Jersey.
*Seltzer, John W.,	1909	Franklin Furnace, N. J.
*Sheeler, George W.,	1912	Snow Shoe, Center Co., Pa.
*Shenefelt, Ira L.,	1916	Department of Forestry, Harrisburg, Pa.
*Siggins, Howard W.,	1914	Department of Forestry, Harrisburg, Pa.
*Smith, Edgar H.,	1911	Department of Forestry, Harrisburg, Pa.
*Smith, Edward S.,	1916	Pine Grove Furnace, Cumberland Co, Pa.
*Smith, Homer A.,	1916	East Waterford, Juniata Co., Pa.
*Stadden, Robert W.,	1914	Greentown, Pike Co., Pa.
Staley, Lewis E.,	1906	Mont Alto, Franklin Co., Pa.
Strobeck, John L.,	1909	Analomink R. D., Monroe Co., Pa.
Thomson, Harry A.,	1909	Box 539, Wesleyville, Erie Co., Pa.

*In Military Service, U. S. Army.

GRADUATES—Continued.

Name	Class	Address
Vail, H. Lawrence,	1910	
*Van Horn, Harry C.,	1914	Conrad, Potter Co., Pa.
Warfield, D. Kerr,	1910	Muddy Creek Forks, York Co., Pa.
*Wells, Arthur B.,	1911	Field Station, Lycoming Co., Pa.
Williams, John R.,	1909	Pine Grove Furnace, Cumberland Co., Pa.
Windle, S. Warren,	1917	Parkesburg R. D. No. 2, Chester Co., Pa.
Winter, Raymond B.,	1910	Mifflinburg, Union Co., Pa.
Witherow, John L.,	1907	Metal, Franklin Co., Pa.
Woof, Charles E.,	1914	Deceased.
*Zerby, Charles E.,	1913	Medix Run, Elk Co., Pa.

*In Military Service, U. S. Army.